AMENDMENTS TO THE CLAIMS

1. (Previously presented) A zoom lens of an inner focus type having four or five lens groups, including at least a first lens group having positive refractive power, a second lens group having negative refractive power, which is movable in an optical axis direction mainly for zooming (varying power), a third lens group having positive refractive power, and a fourth lens group having positive or negative refractive power, which is movable in the optical axis direction for correcting fluctuations in focal position during zooming and for focusing, which lens groups are arrayed in order from an object side, characterized in that:

said first lens group comprises at least a concave lens, a convex lens, and a triple-cemented lens in which a lens made of special low-dispersion glass is sandwiched in the middle, which lenses are arrayed in order from the object side.

2. (Original) The zoom lens as described in claim 1, characterized in that:

said triple-cemented lens in said first lens group includes a first concave lens A1, a convex lens A2 formed of special low-dispersion glass and a second concave lens A3, which lenses are arrayed in order from the object side, and said first concave lens A1 and said convex lens A2 are formed of materials satisfying the following two conditional formulae (1) and (2):

$$(1)\ n1 - n2 > 0.3$$

$$(2)\ |v1 - v2| > 40$$

wherein refractive indexes at a line C, a line d, a line F and a line g are nC, nd, nF and ng, respectively, and

nx is a refractive index nd at the line d of a lens Ax (an xth lens from the object side among the triple-cemented lens, hereinafter, this is the same), and

vx is an Abbe number vd = (nd – 1) / (nF – nC) at the line d of the lens Ax.

3. (Original) The zoom lens as described in claim 1, characterized in that:

said triple-cemented lens in said first lens group includes a first concave lens A1, a convex lens A2 formed of special low-dispersion glass and a second concave lens A3, which lenses are arrayed in order from the object side, and said convex lens A2 and said second concave lens A3 are formed of materials satisfying the following three conditional formulae (3), (4), and (5):

(3) $|n2 - n3| < 0.1$

(4) $v23 > 80$

(5) $\Delta P23 > 0.03$

wherein refractive indexes at a line C, a line d, a line F and a line g are nC, nd, nF and ng, respectively, and

nx is a refractive index nd at the line d of a lens Ax (an xth lens from the object side among the triple-cemented lens, hereinafter, this is the same),

vx is an Abbe number vd = (nd – 1) / (nF – nC) at the line d of the lens Ax, and

Px is a partial dispersion ratio P = (ng – nF) / (nF – nC) of the lens Ax.

4. (Original) The zoom lens as described in claim 2, characterized in that:

said triple-cemented lens in said first lens group includes a first concave lens A1, a convex lens A2 formed of special low-dispersion glass and a second concave lens A3, which lenses are arrayed in order from the object side, and said convex lens A2 and said second concave lens A3 are formed of materials satisfying the following three conditional formulae (3), (4), and (5):

$$(3)\ |n2 - n3| < 0.1$$

$$(4)\ \nu 23 > 80$$

$$(5)\ \Delta P23 > 0.03$$

wherein refractive indexes at a line C, a line d, a line F and a line g are nC, nd, nF and ng, respectively, and

nx is a refractive index nd at the line d of a lens Ax (an xth lens from the object side among the triple-cemented lens, hereinafter, this is the same),

vx is an Abbe number $vd = (nd - 1) / (nF - nC)$ at the line d of the lens Ax, and

Px is a partial dispersion ratio $P = (ng - nF) / (nF - nC)$ of the lens Ax.

5. (Original) The zoom lens as described in claim 1, characterized in that:

said first lens group comprises a first lens of a concave meniscus lens whose convex surface faces the object side, a second lens of a convex lens, a triple-cemented lens made of a third lens of a concave meniscus lens whose convex surface faces the object side, a fourth lens of a convex lens and a fifth lens of a concave meniscus lens whose concave surface faces the object side, and a sixth lens of a convex lens, which lenses are arrayed in order from the object side.

6. (Original) The zoom lens as described in claim 2, characterized in that:

said first lens group comprises a first lens of a concave meniscus lens whose convex surface faces the object side, a second lens of a convex lens, a triple-cemented lens made of a third lens of a concave meniscus lens whose convex surface faces the object side, a fourth lens of a convex lens and a fifth lens of a concave meniscus lens whose concave surface faces the object side, and a sixth lens of a convex lens, which lenses are arrayed in order from the object side.

7. (Original) The zoom lens as described in claim 3, characterized in that:

said first lens group comprises a first lens of a concave meniscus lens whose convex surface faces the object side, a second lens of a convex lens, a triple-cemented lens made of a third lens of a concave meniscus lens whose convex surface faces the object side, a fourth lens of a convex lens and a fifth lens of a concave meniscus lens whose concave surface faces the object side, and a sixth lens of a convex lens, which lenses are arrayed in order from the object side.

8. (Original) The zoom lens as described in claim 4, characterized in that:

said first lens group comprises a first lens of a concave meniscus lens whose convex surface faces the object side, a second lens of a convex lens, a triple-cemented lens made of a third lens of a concave meniscus lens whose convex surface faces the object side, a fourth lens of a convex lens and a fifth lens of a concave meniscus lens whose concave surface faces the object side, and a sixth lens of a convex lens, which lenses are arrayed in order from the object side.

9. (Previously presented) A zoom lens of an inner focus type including a first lens group having positive refractive power, a second lens group having negative refractive power, which is

movable in an optical axis direction mainly for zooming (varying power), a third lens group having positive refractive power, a fourth lens group having negative refractive power, which is movable in the optical axis direction for correcting fluctuations in focal position during zooming and for focusing, and a fifth lens group having positive refractive power, which lens groups are arrayed in order from an object side, characterized in that:

said first lens group comprises a concave lens, a convex lens, and a triple-cemented lens in which a lens made of special low-dispersion glass is sandwiched in the middle, which lenses are arrayed in order from the object side.

10. (Original) The zoom lens as described in claim 9, characterized in that:

said triple-cemented lens in said first lens group includes a first concave lens A1, a convex lens A2 formed of special low-dispersion glass and a second concave lens A3, which lenses are arrayed in order from the object side, and said first concave lens A1 and said convex lens A2 are formed of materials satisfying the following two conditional formulae (1) and (2):

$$(1)\ n1 - n2 > 0.3$$

$$(2)\ |v1 - v2| > 40$$

wherein refractive indexes at a line C, a line d, a line F and a line g are nC, nd, nF and ng, respectively, and

nx is a refractive index nd at the line d of a lens Ax (an xth lens from the object side among the triple-cemented lens, hereinafter, this is the same), and

vx is an Abbe number $vd = (nd - 1) / (nF - nC)$ at the line d of the lens Ax.

11. (Original) The zoom lens as described in claim 9, characterized in that:

said triple-cemented lens in said first lens group includes a first concave lens A1, a convex lens A2 formed of special low-dispersion glass and a second concave lens A3, which lenses are arrayed in order from the object side, and said convex lens A2 and said second concave lens A3 are formed of materials satisfying the following three conditional formulae (3), (4), and (5):

$$(3)\ |n2 - n3| < 0.1$$

$$(4)\ v23 > 80$$

$$(5)\ \Delta P23 > 0.03$$

wherein refractive indexes at a line C, a line d, a line F and a line g are nC, nd, nF and ng, respectively, and

nx is a refractive index nd at the line d of a lens Ax (an xth lens from the object side among the triple-cemented lens, hereinafter, this is the same),

vx is an Abbe number $vd = (nd - 1) / (nF - nC)$ at the line d of the lens Ax, and

Px is a partial dispersion ratio $P = (ng - nF) / (nF - nC)$ of the lens Ax.

12. (Original) The zoom lens as described in claim 10, characterized in that:

said triple-cemented lens in said first lens group includes a first concave lens A1, a convex lens A2 formed of special low-dispersion glass and a second concave lens A3, which lenses are arrayed in order from the object side, and said convex lens A2 and said second concave lens A3 are formed of materials satisfying the following three conditional formulae (3), (4), and (5):

$$(3)\ |n2 - n3| < 0.1$$

(4) $v23 > 80$

(5) $\Delta P23 > 0.03$

wherein refractive indexes at a line C, a line d, a line F and a line g are nC, nd, nF and ng, respectively, and

nx is a refractive index nd at the line d of a lens Ax (an xth lens from the object side among the triple-cemented lens, hereinafter, this is the same),

vx is an Abbe number $vd = (nd - 1) / (nF - nC)$ at the line d of the lens Ax, and

Px is a partial dispersion ratio $P = (ng - nF) / (nF - nC)$ of the lens Ax.

13. (Original) The zoom lens as described in claim 9, characterized in that:

said first lens group comprises a first lens of a concave meniscus lens whose convex surface faces the object side, a second lens of a convex lens, a third lens of a concave meniscus lens whose convex surface faces the object side, a fourth lens L4 of a convex lens, a triple-cemented lens made of a fifth lens of a concave meniscus lens whose convex surface faces the object side, a sixth lens of a convex lens and a seventh lens of a concave meniscus lens whose concave surface faces the object side, and a sixth lens of a convex lens, which lenses are arrayed in order from the object side.

14. (Original) The zoom lens as described in claim 10, characterized in that:

said first lens group comprises a first lens of a concave meniscus lens whose convex surface faces the object side, a second lens of a convex lens, a third lens of a concave meniscus lens whose convex surface faces the object side, a fourth lens L4 of a convex lens, a triple-cemented lens made of a fifth lens of a concave meniscus lens whose convex surface faces the object side, a sixth lens of

a convex lens and a seventh lens of a concave meniscus lens whose concave surface faces the object side, and an eighth lens of a convex lens, which lenses are arrayed in order from the object side.

15. (Original) The zoom lens as described in claim 11, characterized in that:

said first lens group comprises a first lens of a concave meniscus lens whose convex surface faces the object side, a second lens of a convex lens, a third lens of a concave meniscus lens whose convex surface faces the object side, a fourth lens L4 of a convex lens, a triple-cemented lens made of a fifth lens of a concave meniscus lens whose convex surface faces the object side, a sixth lens of a convex lens and a seventh lens of a concave meniscus lens whose concave surface faces the object side, and an eighth lens of a convex lens, which lenses are arrayed in order from the object side.

16. (Original) The zoom lens as described in claim 12, characterized in that:

said first lens group comprises a first lens of a concave meniscus lens whose convex surface faces the object side, a second lens of a convex lens, a third lens of a concave meniscus lens whose convex surface faces the object side, a fourth lens L4 of a convex lens, a triple-cemented lens made of a fifth lens of a concave meniscus lens whose convex surface faces the object side, a sixth lens of a convex lens and a seventh lens of a concave meniscus lens whose concave surface faces the object side, and an eighth lens of a convex lens, which lenses are arrayed in order from the object side.

17. (Original) The zoom lens as described in claim 9, characterized in that:

said first lens group comprises a first lens of a concave meniscus lens whose convex surface faces the object side, a second lens of a convex lens, a cemented lens made of a third lens L3 of a

concave meniscus lens whose convex surface faces the object side and a fourth lens of a convex lens, a triple-cemented lens made of a fifth lens of a concave meniscus lens whose convex surface faces the object side, a sixth lens of a convex lens and a seventh lens of a concave meniscus lens whose concave surface faces the object side, and an eighth lens of a convex lens, which lenses are arrayed in order from the object side.

18. (Original) The zoom lens as described in claim 10, characterized in that:

said first lens group comprises a first lens of a concave meniscus lens whose convex surface faces the object side, a second lens of a convex lens, a cemented lens made of a third lens L3 of a concave meniscus lens whose convex surface faces the object side and a fourth lens of a convex lens, a triple-cemented lens made of a fifth lens of a concave meniscus lens whose convex surface faces the object side, a sixth lens of a convex lens and a seventh lens of a concave meniscus lens whose concave surface faces the object side, and an eighth lens of a convex lens, which lenses are arrayed in order from the object side.

19. (Original) The zoom lens as described in claim 11, characterized in that:

said first lens group comprises a first lens of a concave meniscus lens whose convex surface faces the object side, a second lens of a convex lens, a cemented lens made of a third lens L3 of a concave meniscus lens whose convex surface faces the object side and a fourth lens of a convex lens, a triple-cemented lens made of a fifth lens of a concave meniscus lens whose convex surface faces the object side, a sixth lens of a convex lens and a seventh lens of a concave meniscus lens

whose concave surface faces the object side, and an eighth lens of a convex lens, which lenses are arrayed in order from the object side.

20. (Original) The zoom lens as described in claim 12, characterized in that:

said first lens group comprises a first lens of a concave meniscus lens whose convex surface faces the object side, a second lens of a convex lens, a cemented lens made of a third lens L3 of a concave meniscus lens whose convex surface faces the object side and a fourth lens of a convex lens, a triple-cemented lens made of a fifth lens of a concave meniscus lens whose convex surface faces the object side, a sixth lens of a convex lens and a seventh lens of a concave meniscus lens whose concave surface faces the object side, and an eighth lens of a convex lens, which lenses are arrayed in order from the object side.

21. (Currently Amended) An imaging apparatus having a zoom lens, imaging means for transforming an image taken in by said zoom lens to an electrical image signal, and image control means, characterized in that:

said image control means, referring to a transformation coordinate coefficient provided in advance according to a variable power rate by said zoom lens, moves points on the image which are defined by the image signal formed by said imaging means to form a new image signal subjected to coordinate transformation and to output said new image signal,

said zoom lens of an inner focus type having four or five lens groups, comprises at least a first lens group having positive refractive power, a second lens group having negative refractive power, which is movable in an optical axis direction mainly for zooming (varying power), a third

lens group having positive refractive power, and a fourth lens group having positive or negative refractive power, which is movable in the optical axis direction for correcting fluctuations in focal position during zooming and for focusing, which lens groups are arrayed in order from an object side, and

said first lens group comprises at least a concave lens, a convex lens, and a triple-cemented lens in which a lens made of special low-dispersion glass is sandwiched in the middle, which lenses are arrayed in order from the object.

22. (Original) The imaging apparatus as described in claim 21, characterized in that:

said triple-cemented lens in said first lens group includes a first concave lens A1, a convex lens A2 formed of special low-dispersion glass and a second concave lens A3, which lenses are arrayed in order from the object side, and said first concave lens A1 and said convex lens A2 are formed of materials satisfying the following two conditional formulae (1) and (2):

$$(1)\ n1 - n2 > 0.3$$

$$(2)\ |v1 - v2| > 40$$

wherein refractive indexes at a line C, a line d, a line F and a line g are nC, nd, nF and ng, respectively, and

nx is a refractive index nd at the line d of a lens Ax (an xth lens from the object side among the triple-cemented lens, hereinafter, this is the same), and

vx is an Abbe number $vd = (nd - 1) / (nF - nC)$ at the line d of the lens Ax.

23. (Original) The imaging apparatus as described in claim 21, characterized in that:

said triple-cemented lens in said first lens group includes a first concave lens A1, a convex lens A2 formed of special low-dispersion glass and a second concave lens A3, which lenses are arrayed in order from the object side, and said convex lens A2 and said second concave lens A3 are formed of materials satisfying the following three conditional formulae (3), (4), and (5):

(3) $|n2 - n3| < 0.1$

(4) $v23 > 80$

(5) $\Delta P23 > 0.03$

wherein refractive indexes at a line C, a line d, a line F and a line g are nC, nd, nF and ng, respectively, and

nx is a refractive index nd at the line d of a lens Ax (an xth lens from the object side among the triple-cemented lens, hereinafter, this is the same),

vx is an Abbe number $vd = (nd - 1) / (nF - nC)$ at the line d of the lens Ax, and

Px is a partial dispersion ratio $P = (ng - nF) / (nF - nC)$ of the lens Ax.

24. (Original) The imaging apparatus as described in claim 22, characterized in that:

said triple-cemented lens in said first lens group includes a first concave lens A1, a convex lens A2 formed of special low-dispersion glass and a second concave lens A3, which lenses are arrayed in order from the object side, and said convex lens A2 and said second concave lens A3 are formed of materials satisfying the following three conditional formulae (3), (4), and (5):

(3) $|n2 - n3| < 0.1$

(4) $v23 > 80$

(5) $\Delta P23 > 0.03$

wherein refractive indexes at a line C, a line d, a line F and a line g are nC, nd, nF and ng, respectively, and

nx is a refractive index nd at the line d of a lens Ax (an xth lens from the object side among the triple-cemented lens, hereinafter, this is the same),

vx is an Abbe number $vd = (nd - 1) / (nF - nC)$ at the line d of the lens Ax, and

Px is a partial dispersion ratio $P = (ng - nF) / (nF - nC)$ of the lens Ax.

25. (Original) The imaging apparatus as described in claim 21, characterized in that:

said first lens group comprises a first lens of a concave meniscus lens whose convex surface faces the object side, a second lens of a convex lens, a triple-cemented lens made of a third lens of a concave meniscus lens whose convex surface faces the object side, a fourth lens of a convex lens and a fifth lens of a concave meniscus lens whose concave surface faces the object side, and a sixth lens of a convex lens, which lenses are arrayed in order from the object side.

26. (Original) The imaging apparatus as described in claim 22, characterized in that:

said first lens group comprises a first lens of a concave meniscus lens whose convex surface faces the object side, a second lens of a convex lens, a triple-cemented lens made of a third lens of a concave meniscus lens whose convex surface faces the object side, a fourth lens of a convex lens and a fifth lens of a concave meniscus lens whose concave surface faces the object side, and a sixth lens of a convex lens, which lenses are arrayed in order from the object side.

27. (Original) The imaging apparatus as described in claim 23, characterized in that:

said first lens group comprises a first lens of a concave meniscus lens whose convex surface faces the object side, a second lens of a convex lens, a triple-cemented lens made of a third lens of a concave meniscus lens whose convex surface faces the object side, a fourth lens of a convex lens and a fifth lens of a concave meniscus lens whose concave surface faces the object side, and a sixth lens of a convex lens, which lenses are arrayed in order from the object side.

28. (Original) The imaging apparatus as described in claim 24, characterized in that:

said first lens group comprises a first lens of a concave meniscus lens whose convex surface faces the object side, a second lens of a convex lens, a triple-cemented lens made of a third lens of a concave meniscus lens whose convex surface faces the object side, a fourth lens of a convex lens and a fifth lens of a concave meniscus lens whose concave surface faces the object side, and a sixth lens of a convex lens, which lenses are arrayed in order from the object side.